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Stinson, Jr. et al.

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[54] **MUSICAL INSTRUMENT**

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[52] **U.S. Cl.** **84/1.17**, 84/424, 84/425

[51] **Int. Cl.** **G10h 1/00**

[58] **Field of Search** ..... 84/1.01, 423, 424, 84/425, 427, 428, 1.17, 1.09, 1.1, 1.27, 433, DIG. 7

[56] **References Cited**

UNITED STATES PATENTS

3,198,055	8/1965	Von Gunten	84/1.17 X
3,227,027	1/1966	Von Gunten	84/1.17 X
3,358,070	12/1967	Young	84/1.17
1,239,609	9/1917	Little	84/425
2,832,251	4/1958	Hayslett	84/423 X
2,873,637	2/1959	Herold	84/DIG. 7

FOREIGN PATENTS OR APPLICATIONS

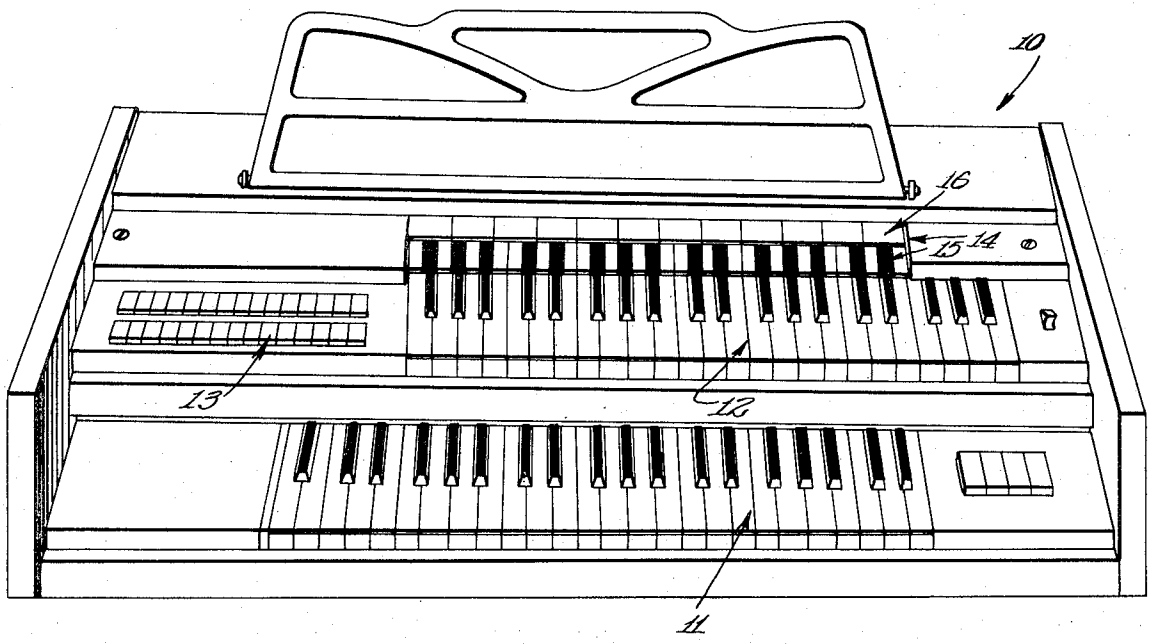
614,940	12/1926	France	84/423
266,760	8/1929	Italy	84/423
132,345	4/1929	Switzerland	84/423

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[57] **ABSTRACT**

A musical instrument includes an auxiliary keyboard having one set of keys for playing chromatic scales and a second set of keys for playing arpeggios. The first set of keys is connected in parallel with one manual, and the second set of keys is connected in series with the other manual whereby chords played on such other manual enable the playing of arpeggios by a successive operation of successive keys.

16 Claims, 7 Drawing Figures



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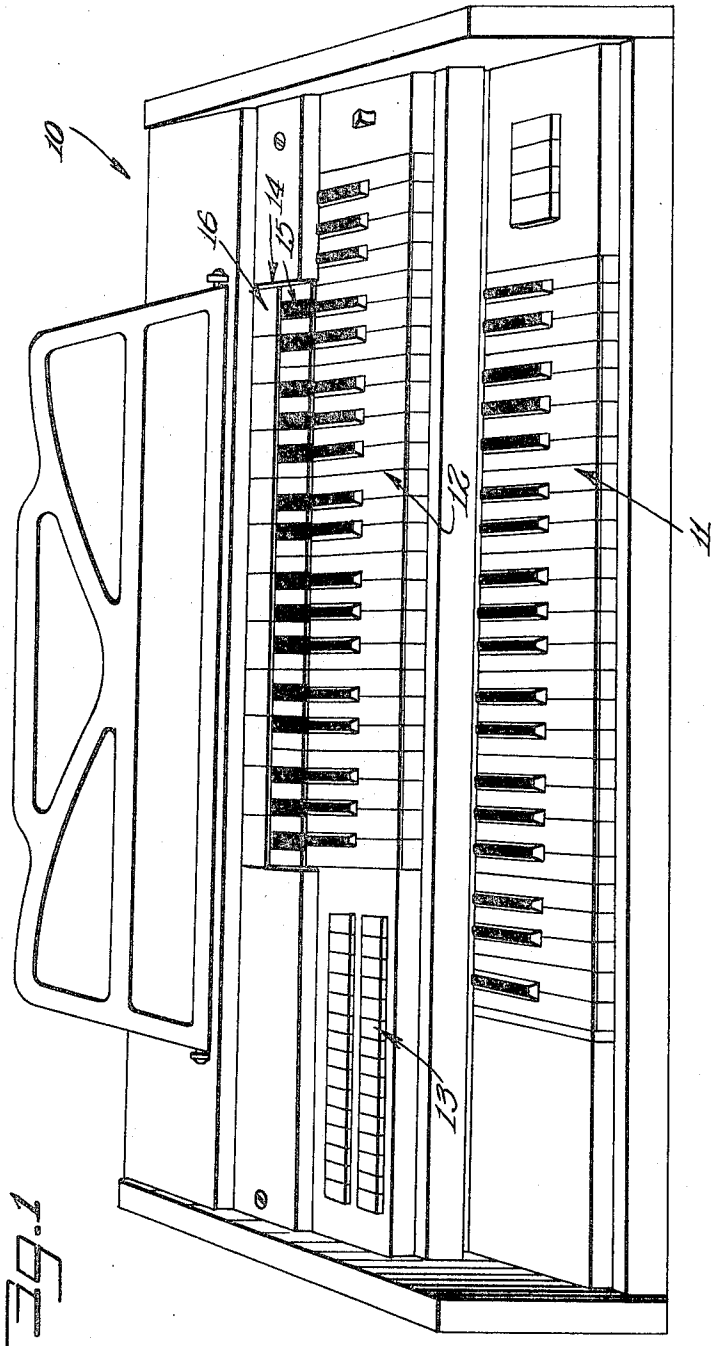


Fig. 1

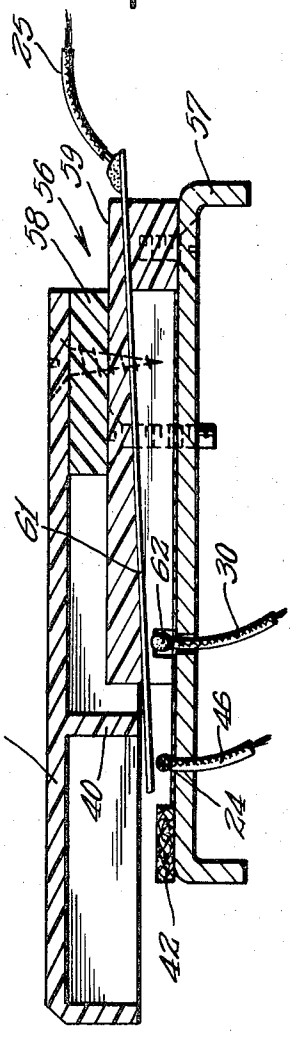


Fig. 7

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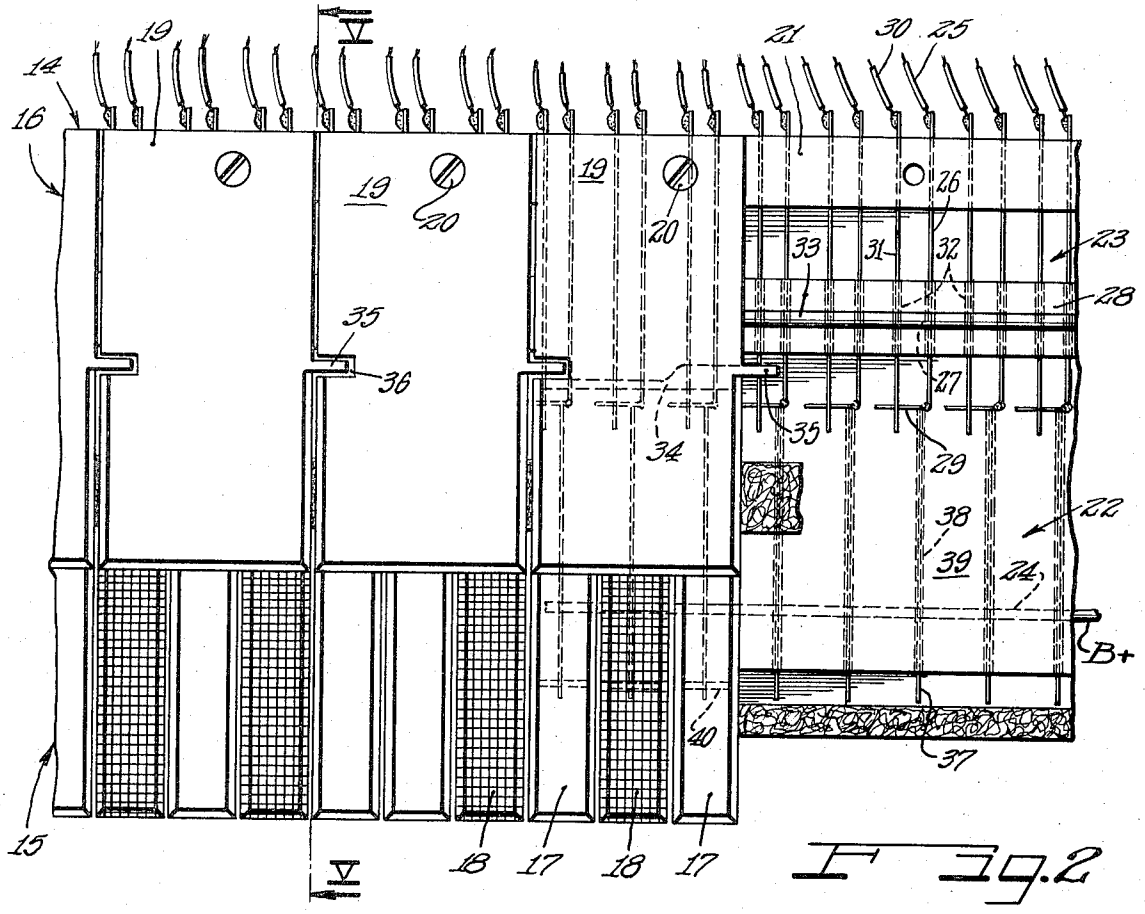


Fig. 2

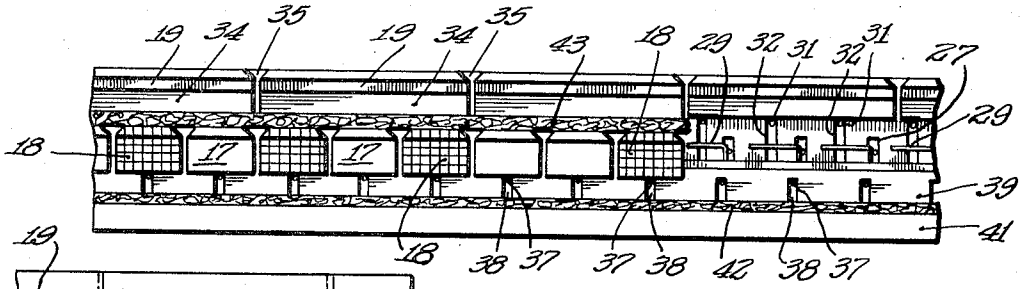


Fig. 3

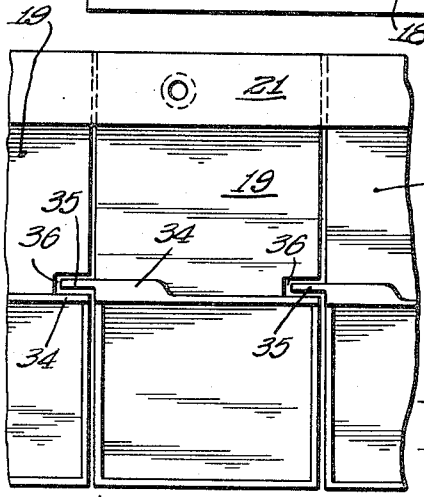


Fig. 4

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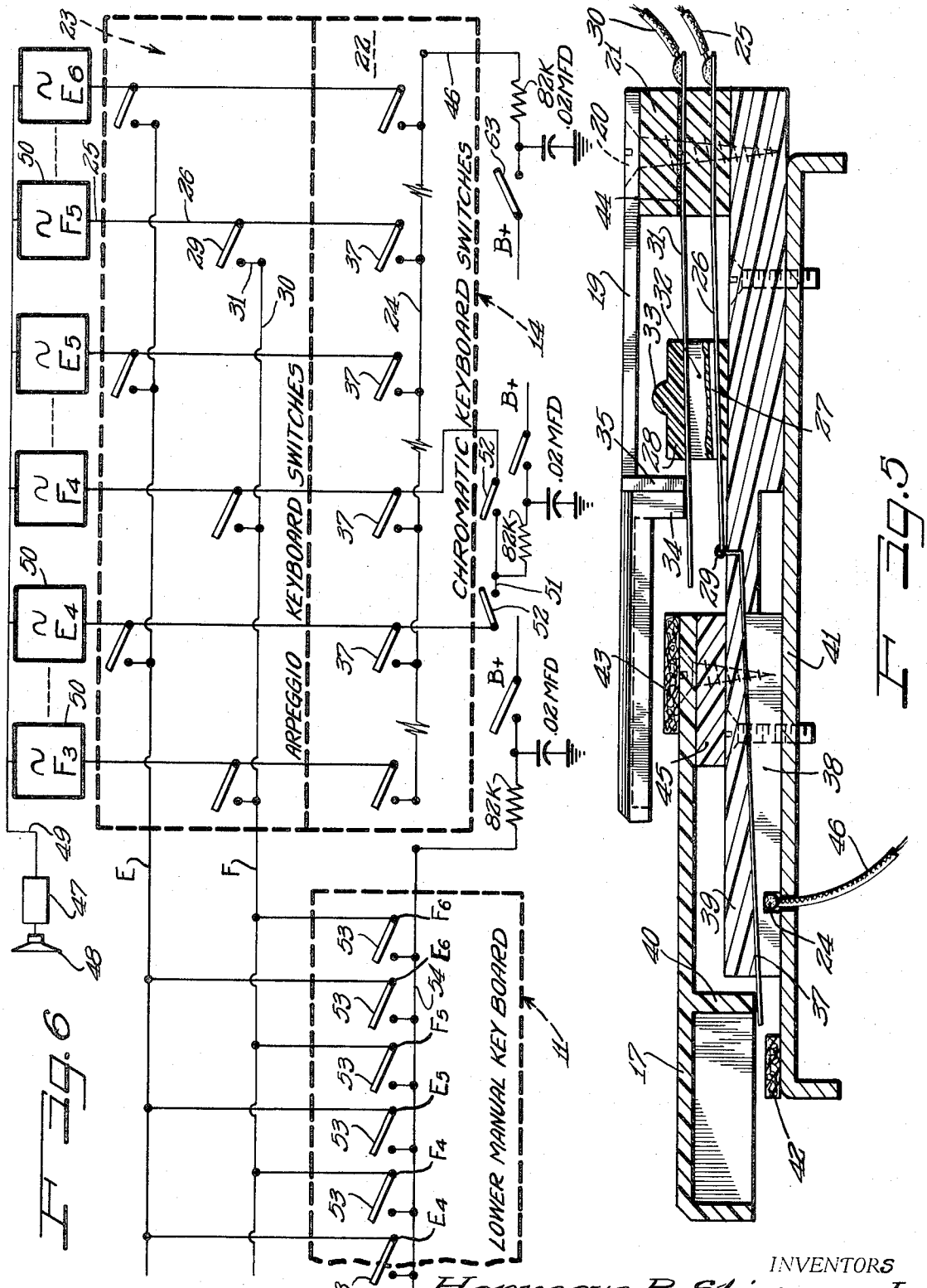


FIG. 6

FIG. 5

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MUSICAL INSTRUMENT

This invention relates generally to a musical instrument such as of the organ type, and more specifically to an instrument which includes an auxiliary keyboard of special construction so connected in the circuit of the instrument as to facilitate playing of chromatic scales and arpeggios.

Although the principles of the present invention may be included in various organs, a particularly useful application is made in an organ of the electronic type, such as one employing an upper and a lower manual. The development of certain playing skills or techniques for instruments having a pianoforte type of keyboard normally requires years of lessons and diligent practice. The rapid smooth performance of a chromatic scale is not easily accomplished by a beginner. The rapid playing of an arpeggio of even a simple chord is likewise difficult for a beginner to accomplish. Other playing techniques and skills mentioned later herein are also difficult for the beginner and certain ones would be considered by professionals as being impossible to perform.

By means of our invention, the performance of the above-mentioned playing techniques is rendered simple and easy for both the beginner and the professional, and this invention opens new vistas of musical composition, performance, and the like. This result is achieved by the use of an auxiliary keyboard so disposed that the conventional keyboard and the auxiliary keyboard may both be engaged by the same hand simultaneously. The auxiliary keyboard is unique in that it includes all of the notes in a chromatic scale while its keys for such chromatic scale are of uniform height or level, thereby enabling the fingers or the palm to move smoothly and rapidly along a series of keys without lifting the hand or fingers. Further, the keys are characterized by an extremely low travel so that very little vertical movement of the hand is necessary once the hand engages the keys.

Accordingly, it is an object of the present invention to provide a novel musical instrument.

A further object of the present invention is to provide an organ having an auxiliary keyboard so constructed as to facilitate the playing of chromatic scales and arpeggios.

A further object of the present invention is to provide a keyboard which will enable a person having little musical training to improvise music wherein the improvisations include right-hand tones which are automatically harmonically related with chord notes being played by the left hand.

A still further object of the present invention is to provide an organ having four manuals.

A still further object of the present invention is to provide an instrument so constructed that a chromatic scale may be played wherein each "note" of the scale actually comprises a group of two, three or four harmonically related notes substantially within the range of one octave.

Yet another object of the present invention is to provide an organ on which harp-like glissandos of the chromatic type and of the arpeggio type may be readily produced.

Yet another object is the provision of means by which an organist may play instrumental slurs and smears such as the opening clarinet slur in "Rhapsody in Blue." Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and to the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

ON THE DRAWINGS

FIG. 1 is a front perspective view of the upper part of a musical organ employing an auxiliary keyboard provided in accordance with the principles of the present invention;

FIG. 2 is a fragmentary plan view of the auxiliary keyboard of FIG. 1 with parts removed;

FIG. 3 is a fragmentary front elevational view of the auxiliary keyboard with parts removed at one end thereof;

FIG. 4 is a bottom view of a number of arpeggio keys shown in FIG. 2;

FIG. 5 is an enlarged cross-sectional view taken generally along the line V—V of FIG. 2;

FIG. 6 is a fragmentary schematic diagram of representative portions of the auxiliary keyboard together with representative associated components of the musical instrument, such as an electronic organ; and

FIG. 7 is a cross-sectional view of a modified form of auxiliary keyboard.

AS SHOWN ON THE DRAWINGS

The principles of this invention are particularly useful when embodied in a musical organ, such as an electronic organ, the upper portion of which is shown in FIG. 1 and which is generally indicated by the numeral **10.** The portions of the organ **10** not illustrated include the conventional cabinet, pedal keys, and the like as are well known. The organ **10** includes a lower key manual generally indicated at **11,** an upper key manual generally indicated at **12,** and a set of tabs or voicing stops generally indicated at **13.** The lower key manual includes key switches which are connected to couple conventional tone signal sources to an output means such as an amplifier and speaker, such key switches being in series with switches under the control of various ones of the tab switches **13.** Thus, as is conventional, various voicings may be made available and produced by playing of the keys of the lower key manual **11.** Similarly, the upper key manual **12** is associated with various tone signal sources likewise under the control of others of the tab switches **13,** as is also conventional. The lower key manual **11** and the upper key manual **12** include conventional keys wherein the black keys (which are the sharps and the flats for music not in the key of C) project upwardly therefrom. The lower and upper manuals **11** and **12** are functionally associated with tone signal sources having frequencies which correspond to all of the **12** notes in an octave of a chromatic scale.

According to the present invention, the organ **10** includes an auxiliary keyboard generally indicated at **14** having a first set of chromatic keys generally indicated at **15,** and a second set of arpeggio keys generally indicated at **16.** The auxiliary keyboard thus has two manuals of keys which respectively comprise the chromatic keys **15** and the arpeggio keys **16.** The auxiliary keyboard **14** is disposed at the rear of one of the manuals **11, 12,** and in particular, is disposed at the rear of the upper key manual, **12.** All of the keys of the auxiliary

chromatic manual **15** have upper or fingering surfaces which lie in a single plane, and all of the keys of the auxiliary arpeggio keyboard **16** have upper surfaces which lie in a single or common plane. The auxiliary keyboard **14** is disposed at a vertical height so that the upper or fingering surfaces of its keys lie substantially at the level, height, or plane of the upper surfaces of the black keys of the upper key manual **12.** For each of the black keys in the key manual **12,** there is a black key in the auxiliary chromatic manual **15,** and such auxiliary key is aligned with the key in the main or upper manual. Similarly, there is a white key in the auxiliary chromatic manual **15** which is aligned with a white key in the upper key manual **12.** Thus the center-to-center spacing of the keys **15** is the same as that of the keys of the upper manual as shown in FIG. **1.** It is emphasized that the black keys and the white keys in the auxiliary chromatic manual **15** are all at a single height. The keys of the auxiliary arpeggio keyboard **16** are aligned with a plurality of the keys in the auxiliary chromatic keyboard **15** and with a plurality of the keys in the upper key manual **12.** Thus their center-to-center distance exceeds that of the keys of the upper manual **12** as shown in FIG. **1.** In the illustrated embodiment, the keys of the auxiliary arpeggio keyboard **16** are aligned with three keys from such other manuals, each. As is brought out in greater detail later herein, the keys of the auxiliary chromatic manual **15** are associated with switches connected in electrical parallel with one of the switches normally used and operated by the upper key manual **12.** The keys of the auxiliary arpeggio manual **16** are associated with switches described later herein which tentatively couple the tone signal sources of all of the keys with which each such arpeggio key is aligned, such coupling being to the output means. However, the coupling to none of such tone signal sources is completed until a key in the lower key manual of the same scale letter or note is depressed. Thus, the tones produced by each of the keys in the auxiliary arpeggio manual **16** are under the control of keys in the lower key manual **11.**

In FIG. **2,** there is illustrated an enlarged fragmentary view of the auxiliary manual **14** with certain keys removed to expose switch elements disposed therebeneath. The auxiliary chromatic manual **15** is composed of a number of white keys **17** and black keys **18,** the color being the sole difference between the chromatic keys **17** and **18.** The auxiliary arpeggio manual **16** is composed of a number of wide keys **19** which may be of any color. The arpeggio keys **19** are secured as by a screw **20** to a key rail **21** which underlies all the arpeggio keys **19.** Beneath the chromatic keys **17** and **18** there is disposed a set of key switches **22,** while beneath the arpeggio keys **19** there is disposed a set of key switches **23.** The set of key switches **22** includes a bus **24** which extends the length of the auxiliary chromatic manual **15.** The sets of key switches **22,23** are so constructed as to employ one element in common to the switches pertaining to one note in the two sets. For each note there is provided a lead **25** which is connected to an appropriate tone signal source at the end not shown in FIG. **2,** and such lead extends into the auxiliary keyboard **14** by being secured to a wire-like terminal **26** the outer end of which is secured to the key rail **21.** The element **26** extends through a slot **27** in a spacer member **28** and has a forward end **29** disposed at right angles thereto and lying in a horizontal plane.

A further lead wire **30** comprises another element **31** which is likewise secured to the key rail **21** and extends forwardly in parallel spaced relation to the element **26** and in vertically spaced transverse relation to the element or angle portion **29.** The switch element **26, 29** is fixed, while the switch element **31** is movable up and down in a further slot **32** in the insulating spacer member **28.** Because of such slots **27,32,** a stiffener rib **33** is provided on the upper surface of the spacer rib **28** which rib **33** extends along its entire length. Each of the keys **19** is provided with an actuator portion **34** which is integral with the underside thereof at a movable portion thereof and which overlies the switch elements **31, 26** between the forward edge of th spacer rib **28** and the transverse portions **29.** Such actuator portion or structure is shown in broken lines in the middle of FIG. **2,** and is more clearly seen in FIG. **4** wherein one of the keys **19** is illustrated from below. The actuator portion **34** has a lateral extension **35** which is received in a slot **36** of the adjacent key **19,** namely the key **19** associated with the next higher pitched notes, where such extension **35** as well as the actuator portion **34** of such adjacent key can engage and deflect the element **31** into contact with the contact portion **29.** The note that the extension **35** thus also causes to be produced is the note which is nearest in frequency of the notes or keys associated with such next higher playing key. Thus each of the keys **19** is associated with a group of three switches, and its extension **35** is associated with one of the switches of the next higher group. It is not advisable to have more than four of the switches **29, 31** closed at one time by any one arpeggio key for the most pleasing tonal results. Thus for most left-hand controlled chords, a single tone will be produced by each arpeggio key **19.**

The element **26** of the key switch structure **23** is common to the key switch structure **22,** and to this end there is secured thereto, both mechanically and electrically, a wirelike portion **37** which is guided in a slot **38** provided in an insulated base **39.** The element **37** overlies the bus **24** and is engageable therewith when deflected downwardly. Such downward deflection is provided by the associated chromatic key **17** or **18,** each of which has an actuator portion **40** integrally molded to the lower surface thereof at a movable portion thereof in alignment with the distal or outer end of such element **37** for directly engaging and operating the same. The key switch structures **22, 23** may be employed to conduct tone signals, and may be employed to conduct coupling potentials, depending upon the nature of the generation system employed in a particular organ. It is to be understood that this invention is not to be restricted to either type of usage.

FIG. **3** illustrates a front view of a portion of the auxiliary keyboard **14,** which view is substantially restricted or obscured in an actual installation by the associated key manual, such as the upper key manual **12.**

The insulative base **39** is carried on a frame **41,** and beneath the fingering portion of the keys **17, 18,** there is disposed a felt strip **42** which is engaged by the lower ends of such keys **17, 18.** Likewise, a second felt strip **43** is disposed above the fixed ends of the keys **17, 18** and is engaged by the lower side of the arpeggio keys **19.** The structure of the auxiliary keyboard **14** thus far described is better understood by reference to FIG. **5.** The frame **41** comprises a downwardly opening channel member which extends the length of the auxiliary

keyboard 14. As shown, each of the arpeggio keys 19 and each of the auxiliary chromatic keys 17 and 18 comprise molded plastic, such keys 17-19 being firmly held and supported at their rear ends so that each extends forwardly as a cantilever. Although the rear key rail 21 has been illustrated as a stack of three parts, it is to be understood that this may comprise a unitary molded piece. Where it is desired to be able to replace the switch elements 26 or 31, the element 21 may be split at the plane of the supported ends of the elements 31 and the switch elements 26 supported at such plane. If desired, a quantity of cement or tape 44 may be employed to assist in the assembly. The auxiliary chromatic keys 17 are supported on the insulative base 39 by a forward key rail 45, and at least one lead wire 46 is connected to the bus 24. The structure shown in FIG. 5 is in reality quite small as the drawing is twice as large as the actual parts in heighth and width.

As shown in FIG. 6, the organ 10 includes a conventional output means including an amplifier 47 and a speaker 48. These are coupled by a collector bus 49 to each of a series of tone signal sources 50 respectively having frequencies which correspond to a number of octaves of the equal tempered chromatic scale. A representative number of such tone signal sources 50 is shown. However, it is to be understood that corresponding structure is provided for every key or note within the range of the auxiliary keyboard 14. In a well known type of organ construction, a coupling potential B+ is supplied to a keying bus 51 common to a number of keying switches 52 which are closed by actuation of the keys of the upper key manual 12. Closing one of the switches 52 causes a B+ potential to be applied to the corresponding tone signal source 50, thereby rendering it operative or coupled to the output means 47, 48. In like manner, the keys of the lower key manual 11 are provided with a number of key switches (not shown but similar to the switches 52) each having an element disposed to contact a keying bus such as 51 of the upper manual, common to all of the lower manual key switches. Closing of any of such switches causes a coupling potential to be conducted to other appropriate tone signal sources 50. By the use of the upper key manual 12 and its key switches 52, and by the use of the lower key manual 11 and its similar key switches, the organ 10 is played in a conventional manner.

The structural configuration of the arpeggio key switches 23 and the auxiliary chromatic key switches 22 is described above in connection with FIG. 2. Schematically, these switches and structures appear in the rectangular areas corresponding to the switches 23 and 22. Thus each of the first switch elements 26, 29, 37 is connected to a tone signal source 50 by means of the wire 25, the second element or bus 24 common to all the auxiliary chromatic keyboard switches 22 is connected by the wire 46 to a source of coupling potential B+, and the third element 31 of the arpeggio switches 23 is connected by a lead wire 30 to the movable element of one of a number of intelligence switches 53 actuated by the keys 11 of the lower key manual 11 which coact with a further B+ bus 54. In addition, the wire 30 leading from the element 31 of each key structure is connected to all other elements 31 which are associated with octavely related key switch structures. This is illustrated in the instance of the wire 30 for a line denoted as F which is thus associated with each of the F notes in all the octaves of the auxiliary keyboard 14. In like manner a line designated as E is connected to the corresponding element of all of the arpeggio switches for keying E notes. Ten other lines such as E and F are employed for the other notes of the chromatic octave, but have been omitted from the drawing for simplicity of illustration. The line 30 or F line is connected to the movable element of all of the intelligence switches 53 associated with F keys in the lower manual 11, and in like manner the E line and the other lines not illustrated are connected to the movable element of all intelligence switches associated with a correspondingly designated key or frequency.

With the tabs controlling the B+ switches closed, the organ 10 is played in a conventional manner even though the bus 24 is energized. Thus when one of the upper manual switches 52 is closed by playing of the associated key, a certain sound or tone will be produced by the output means. The same sound or tone is produced by depressing the associated auxiliary chromatic key and hence by effecting closing or engaging of the switch element 37 with the bus 24. However, the musician's finger can be slid rapidly along the upper surface of the auxiliary chromatic keys 18, 17 thereby coupling the various tone signal sources to the output means in rapid succession as if the musician were expertly playing a chromatic scale on the regular or upper manual. If the musician chooses, he may simultaneously depress two keys on the auxiliary chromatic manual 15, such as C and E, and with the fingers stiffly held at the interval necessary to engage those keys, the hand may be moved to the left or the right relatively rapidly, thus producing the simultaneous playing of two chromatic scales which are a third apart, and thus in the nature of a duet. If the notes designated C, E and G are simultaneously depressed on the auxiliary chromatic manual 15, a chord which comprises a major triad is produced. By moving the hand stiffly to the left or the right, a trio of chromatic scales are simultaneously performed wherein a chord is at all times sounding. By holding the fingers in other rigid conformations, the other types of harmonic chords may be produced and converted into a rapid succession of chords chromatically related to each other. Thus a playing technique is brought about which is beyond the ability of a trained musician using a conventional keyboard.

The foregoing effects can be greatly expanded depending upon the selection of settings employed for the tabs 13. For example, if the upper manual is set to produce a harp-like tone, a harp glissando can be produced by running one finger back and forth on the auxiliary chromatic manual 14. As a further example, if the tabs 13 are so set as to give a clarinet tone to the upper manual, the musician may play portions of the passage on the conventional upper key manual 12, and without relinquishing release thereon, pick up the same note on the auxiliary chromatic manual and then rapidly slide or slur to some distant note which is also picked up by another finger or the thumb on the adjacent upper key manual.

As there are 12 notes in a chromatic octave, and since chords normally have three or four notes which make them up, and as they are approximately uniformly spaced, the playing of a chord with the left hand on the lower manual will usually complete the circuit for one of the switches associated with each of the arpeggio keys 19. However, when a three-note chord is

played, one of the keys **19** in an octave would likely be non-productive of a tone when depressed. However, this problem is avoided by use of the extensions **35** on the keys **19**, so that an otherwise dead key may be expected to be sounded. When a four-note chord is held by the left hand in almost every instance there will be one of the corresponding notes in the arpeggio produced by each of the several keys. The structure thus described produces a balanced arpeggio wherein the note produced by one key is not released or silenced until the note produced by the next key is initiated by engagement of such next key with the finger. Thus the arpeggios are continuous, and are expected to be devoid of gaps between notes corresponding to notes that are not present in the arpeggio being played. Thus a freedom from loping in the sound is obtained. In order that the fingers may move smoothly on each of the keys **17–19**, the playing portions thereof are beveled at their sides as best seen in FIG. **2** to facilitate the smooth sliding of the finger to the left or the right.

It is to be understood that the lower key manual **11** may comprise an arrangement of preset chord-button switches, which would not affect the circuitry hereof.

The auxiliary key board **14** may also be employed to produce duet arpeggios wherein two arpeggio keys **19** are depressed at the same time as the hand moves from the left to the right or returns. Also, a greater number of arpeggio keys may be depressed at one time, thereby permitting rapid inversions of any chord. With this keying structure, the musician is enabled to improvise by simultaneously composing and performing on the spur of the moment without any preparation which may be performed just as easily as one-note melodies or the like.

The auxiliary keyboard **14** may comprise original equipment, and may be constructed in kit form for converting existing organs into a four-manual organ of the type described herein.

A modified form of auxiliary keyboard is shown in FIG. **7**, generally indicated by the numeral **56.** This keyboard includes a frame **57** having a key rail **58** supported on an insulative base **59**, and to which key rail **58** there is secured a number of chromatic keys **60** which are substantially the same as the chromatic keys **17** and **18.** The line **25** is connected to a single flexible first element **61** which corresponds to the element **26** which engages the bus **24** and an individual contact **62** for each key, corresponding to the element **31.** When the form of auxiliary key switch **56** shown in FIG. **7** is connected into the circuit shown in FIG. **6**, and all B+ switches are closed, the keys **60** will perform in exactly the same manner as the auxiliary chromatic manual **15** described above. In order for this manual to function as an arpeggio keyboard, it is necessary to open a B+ switch **63** shown in FIG. **6** whereby only the circuits tentatively closed by the switch **61,62** will be completed on closing of a corresponding lower manual keyboard switch **53.**

Although various minor modifications might be suggested by those versed in the art, it should be understood that we wish to embody within the scope of the patent warranted hereon, all such embodiments as reasonably and properly come within the scope of our contribution to the art.

We claim:

1. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. an upper key manual and a lower key manual each constructed to effect transfer of tone signals from said sources to said output means; and

d. an auxiliary manual of keys disposed at the rear of one of said upper and lower manuals and substantially at the same level and all constructed to effect transfer of the same tone signals to said output means as are transferred by the immediately adjacent keys of said one manual, the keys of said auxiliary manual having a center-to-center spacing at least as great as that of said upper and lower manuals.

2. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. an upper key manual and a lower key manual each constructed to effect transfer of tone signals from said sources to said output means; and

d. an auxiliary keyboard having two manuals of keys disposed at the rear of one of said upper and lower manuals, a first of said auxiliary manuals including a set of chromatic keys respectively aligned with the keys of said one manual, and all such chromatic keys lying in a common plane, and a second of said auxiliary manuals including a set of keys each aligned with a plurality of the keys in said one manual, said auxiliary manuals being operative to effect transfer of the same tone signals to said output means as are transferred by said one manual.

3. An organ as claimed in claim **2** wherein the auxiliary keyboard is disposed at the rear of said upper key manual.

4. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. an upper key manual and a lower key manual each constructed to effect transfer of tone signals from said sources to said output means; and

d. an auxiliary manual of keys disposed at the rear of one of said upper and lower manuals and all constructed to effect transfer of the same tone signals to said output means as are transferred by the keys of said one manual, each of said auxiliary keys being aligned with a plurality of keys in said one manual, and each being operative to effect transfer of the same tone signals to said output means as are transferred by said plurality of keys of said one manual.

5. An organ as claimed in claim **4** wherein said transfer by said auxiliary keys is under the further control of the keys of the other of said upper and lower manuals.

6. An organ as claimed in claim **4** wherein each of said auxiliary keys is aligned with three keys in said one manual.

7. An organ as claimed in claim **4** wherein each of said auxiliary keys has a lateral extension operative to effect transfer of one of the tone signals associated with an immediately adjacent key, the frequency of said one

tone signal being the one nearest to those of the said plurality of keys.

8. An organ as claimed in claim 7 wherein said immediately adjacent key is the next higher pitched key.

9. An organ as claimed in claim 4 wherein each of said auxiliary keys is operative to transfer a maximum of four chromatically consecutive tone signals.

10. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. a chromatic key manual, of the type wherein the black keys extend upwardly from the white keys, constructed to effect transfer of tone signals from said sources to said output means; and

d. an auxiliary keyboard having at least one manual of keys disposed at the rear of and near the level of said first named manual, said auxiliary keys respectively aligned with the keys of said first named manual and all said auxiliary keys having fingered surfaces lying in a common plane, said auxiliary keys being operative to effect transfer of the same tone signals to said output means as are transferred by said first named manual.

11. An organ as claimed in claim 10 in which said first named manual comprises an upper and a lower key manual, said auxiliary keyboard being disposed at the rear of one of said upper and lower key manuals, said transfer by said auxiliary keys being under the further control of the keys of the other of said upper and lower manuals.

12. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. an upper key manual and a lower key manual each constructed to effect transfer of tone signals from said sources to said output means;

d. an auxiliary manual of keys disposed at the rear of one of said upper and lower manuals;

e. a set of key switches under the control of the other of said upper and lower manuals; and

f. a set of switch structures respectively operatively associated with each of said auxiliary keys, and each having a first element electrically connected to one of said tone signal sources respectively which are controlled by said one manual, a second element common to all said switch structures and engageable with the first elements for also effecting transfer of the tone signals to said converting means, and a third element engageable with the corresponding first element and connected in series with said set of key switches for still further effecting transfer of the tone signals to said output means when a corresponding key of said other manual is depressed.

13. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. a chromatic key manual, of the type wherein the black keys extend upwardly from the white keys, constructed to effect transfer of tone signals from said sources to said output means; and

d. an auxiliary keyboard comprising,

1. a frame disposed at the rear of said manual,

2. an auxiliary manual of individual resilient plastic keys, each of said keys being rigidly secured at its rear end to said frame and being deflectable at its forward end as a cantilever by bending of plastic in response to fingering thereof, the upper surface of all said auxiliary keys lying in a common plane, each of said plastic keys including an actuator portion integral with the lower side thereof at a movable portion of such key, and

3. a set of key switches disposed beneath said cantilevered keys, and each including a movable element engaged by said actuator portion of the associated key, said key switches being connected to said tone signal sources for effecting transfer of tone signals to said output means.

14. An organ as claimed in claim 13 wherein each of said cantilevered plastic keys simultaneously mechanically actuates a plurality of said key switches.

15. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. an upper key manual and a lower key manual each constructed to effect transfer of tone signals from said sources to said output means;

d. an arpeggio keyboard having a series of keys wherein the fingering surfaces lie in a common plane;

e. a series of key switches comprising a number of groups of switches which number corresponds to the number of arpeggio keys, each said group of switches being responsive to one of said arpeggio keys, and being operative to tentatively couple a corresponding group of said signal sources associated with one of said manuals to said output means; and

f. a further series of key switches respectively under the control of the keys of the other of said manuals, and respectively connected in series with corresponding arpeggio key switches for completing said coupling.

16. A musical organ comprising in combination:

a. a series of tone signal sources having frequencies corresponding to a chromatic musical scale;

b. output means for converting tone signals produced by said tone signal sources into audible sounds;

c. an upper key manual and a lower key manual each constructed to effect transfer of tone signals from said sources to said output means;

d. an arpeggio keyboard having a series of keys wherein the fingering surfaces lie in a common plane, the keys of said arpeggio keyboard having a center-to-center spacing at least as great as that of said upper and lower key manuals;

e. a series of key switches, each of said switches being responsive to one of said arpeggio keys, and being operative to tentatively couple a corresponding signal source associated with one of said manuals to said output means; and

f. a further series of key switches respectively under the control of the keys of the other of said manuals, and respectively connected in series with corresponding arpeggio key switches for completing said coupling.

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